
Generic Limits and Taxonomy of *Hornungia*, *Pritzelago*, and *Hymenolobus* (Brassicaceae)

Oliver Appel

Institut für Allgemeine Botanik, Ohnhorststraße 18, 22609 Hamburg, Germany

Ihsan A. Al-Shehbaz

Missouri Botanical Garden, P. O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.

ABSTRACT. The genera *Pritzelago* (= *Hutchinsia*) and *Hymenolobus* are reduced to synonymy of *Hornungia*. New combinations for *Hornungia alpina* and its subspecies are proposed. A key to the three species of *Hornungia* is provided.

Generic limits in the Brassicaceae are often arbitrary, usually based only on a few characters, and generally follow tradition rather than being well defined (see e.g., Rollins, 1959; Rollins & Shaw, 1973). However, this is not the case in the closely related *Hornungia* Reichenbach (monotypic), *Pritzelago* Kuntze (monotypic according to Laínz, 1984), and *Hymenolobus* Nuttall (monotypic). Acceptance of the three genera varied considerably among experts of the Brassicaceae and, as shown in Table 1, the genera were frequently united in various combinations.

The taxonomic status of the three genera became even more confusing because Meyer (1982) showed that the well-established name *Hutchinsia* R. Brown (1812) is illegitimate and should be replaced by the later and obscure *Pritzelago* (1891). *Hutchinsia* had to be abandoned because when published it included *Iberis rotundifolia* L., the holotype of the earlier and legitimate generic name *Noccaea* Moench (1802). For a detailed taxonomic history and complete list of synonymy, see Meyer (1982). A critical evaluation of the genera *Hornungia*, *Hymenolobus*, and *Pritzelago* is presented in Table 2.

All three species in Table 2 are indistinguishable in many features. They have ebracteate corymbose racemes that elongate in fruit, ascending non-saccate sepals, white petals, linear unappendaged filaments, lateral nectaries one on each side of the stamens, no median nectaries, obsolete styles, small entire stigmas, angustiseptate, glabrous, dehiscent, sessile, wingless fruits, keeled valves, complete septa, wingless seeds, and the same chromosome numbers. Additionally, both *Pritzelago* and *Hornungia* also have markedly unequal sized funicles at the ovary apex (Briquet, 1923: fig. 2). The

similarities are remarkable. *Hornungia petraea* and *Hymenolobus procumbens* differ only in the number of ovules (and seeds) per locule and in the cotyledonary position (Table 2). However, markedly deviating ovule and seed numbers frequently occur within well-delimited and even small genera of the Brassicaceae. Evidently, ovule number is not a reliable character at the generic level, and examples of such variation are readily observed in *Ornithocarpa* Rose (2 spp.; Rollins, 1969) and *Stevenia* Adams & Fischer (4 spp.; Kamelin, 1995). Although some types of cotyledonary position (e.g., conduplicate or diplocolobal) are highly significant taxonomically and apparently evolved only once within the family, accumbent and incumbent cotyledons are linked by a series of intermediate forms (usually called oblique), and they obviously evolved independently numerous times. The cotyledonary position within genera or sometimes a given species may shift between accumbent and incumbent (Vaughan & Whitehouse, 1971). Therefore, the cotyledonary types in *Hornungia* and *Hymenolobus* are not reliable characters at the generic level, and intermediate forms are found in *Hornungia*. Evidently, these two species belong to one genus.

Pritzelago alpina differs from *Hornungia* and *Hymenolobus* in the perennial vs. annual habit, absence vs. presence of stem leaves, petal length, and the lack of seed mucilage (Table 2). The first two characters are adaptations to alpine rather than lowland habitats. Reduced petals occur in many genera of the family, and in at least 28 (e.g., *Thlaspi* L., *Isatis* L., *Draba* L.) both well-developed and reduced petals may be found (authors' compilation). Presence vs. absence of seed mucilage may also be found among species of a single genus (Vaughan & Whitehouse, 1971). Therefore, there is no single character of systematic value that would reliably serve to delimit *Hornungia*, *Hymenolobus*, and *Pritzelago*.

The results of this study strongly suggest that *Pritzelago*, *Hornungia*, and *Hymenolobus* cannot be

Table 1. Recognition of *Hornungia*, *Pritzelago*, and *Hymenolobus* by various authors.

	<i>Hornungia petraea</i> (L.) Reichenbach	<i>Pritzelago alpina</i> (L.) Kuntze	<i>Hymenolobus procumbens</i> (L.) Nuttall
Busch (1939), Hedge (1965)	-----	<i>Hutchinsia</i> -----	<i>Hymenolobus</i>
Hegi (1986)	-----	<i>Hutchinsia</i> -----	<i>Capsella</i>
Rollins (1993)	(not treated)	-----	<i>Hutchinsia</i> -----
Ball et al. (1993), Schulz (1936)	<i>Hornungia</i>	<i>Hutchinsia</i>	<i>Hymenolobus</i>

maintained as independent genera and that *Pritzelago alpina* and *Hymenolobus procumbens* are best treated as species of *Hornungia*, the oldest validly published name for this alliance.

Hornungia Reichenbach, *Deutschl. Fl.* 1: 33. 1837. TYPE: *Hornungia petraea* Reichenbach.

Hutchinsia R. Brown, in W. T. Aiton, *Hortus Kew.* ed. 2. 4: 82. 1812, nom. illeg.

Hutchinsiella O. E. Schulz, *Bot. Jahrb. Syst.* 66: 92. 1933. TYPE: *Hutchinsiella perpusilla* (Hemsley) O. E. Schulz.

Hymenolobus Nuttall, in Torrey & A. Gray, *Fl. N. Amer.* 1: 117. 1838. TYPE: Not designated.

Microcardamum O. E. Schulz, *Notizbl. Bot. Gart. Berlin-Dahlem* 10: 467. 1928. TYPE: *Microcardamum tenue* (Barnéoud) O. E. Schulz.

Pritzelago Kuntze, *Revis. Gen. Pl.* 1: 35. 1891. Syn. nov. TYPE: *Pritzelago alpina* (L.) Kuntze.

The three species of *Hornungia* are separated as follows:

- 1a. Plants perennial; leaves all basal; petals exceeding sepals; seeds not mucilaginous
. *H. alpina* (L.) O. Appel
- 1b. Plants annual; leaves basal and cauline; petals about equaling sepals; seeds mucilaginous.
 - 2a. Ovules 2 per locule; cotyledons accumbent or oblique *H. petraea* (L.) Reichenbach
 - 2b. Ovules (3–)5–10 per locule; cotyledons incumbent *H. procumbens* (L.) Hayek

Hornungia alpina (L.) O. Appel, comb. nov. Basionym: *Lepidium alpinum* L., *Cent. Pl.* 2: 23. 1756. TYPE: “Habitat in alpinis Sneberg, Tyrolensibus, Salzburgensibus, Helveticis, Bladi. *Seguier s.n.*,” 824 no. 5 (holotype, LINN).

One sheet at LINN, collected by Seguier, gave no locality data.

The following subspecies are well defined and have been recently recognized in the treatments of Ball et al. (1993) and Greuter et al. (1986). Therefore, their transfer to *Hornungia* is a simple, mechanical transfer that needs no further justification.

Hornungia alpina subsp. ***auerswaldii*** (Willkomm) O. Appel, comb. nov. Basionym: *Hutchinsia auerswaldii* Willkomm, *Flora* 34: 590. 1851. TYPE: Spain. In parte septentrionali occidentali montis calcarei Pena Gorveya in Vizcaya, ad alt. circ. 3–4000 m, 26 May 1850, *Pl. exs. coll. ven. no. 148* (holotype, COI).

Hornungia alpina subsp. ***austroalpina*** (Trpin) O. Appel, comb. nov. Basionym: *Hutchinsia alpina* subsp. *austroalpina* Trpin, *Biol. Vestn.* 22: 63. 1974 [1975]. TYPE: Yugoslavia. Slovenia, Primorsko, Julijske Alpe, Kanin, in glareosis, solo calcareo, ca. 2260 m, 5 Aug. 1955, *E. Mayer* (holotype, LJU, No. 59625).

Table 2. Comparison of *Hornungia*, *Pritzelago*, and *Hymenolobus*.

	<i>Hornungia petraea</i>	<i>Pritzelago alpina</i>	<i>Hymenolobus procumbens</i>
habit	annual	perennial	annual
pubescence	mostly pubescent	mostly pubescent	glabrous or pubescent
trichomes	simple and branched	branched and/or simple	simple and branched
leaves	basal and cauline	all basal	basal and cauline
basal leaves	pinnatisect	pinnatisect	entire to pinnatisect
petal length	not exceeding sepals	exceeding sepals	not exceeding sepals
stamen number	6	6	6 or 4
ovules per locule	2	2	(3–)5–10
fruit shape	elliptic to ovate	elliptic to lanceolate	elliptic to ovate
seed mucilage	present	absent	present
cotyledons	accumbent or oblique	incumbent	incumbent
<i>n</i> =	6	6	6 or 12

Hornungia alpina subsp. **brevicaulis** (Sprengel)

O. Appel, comb. nov. Basionym: *Hutchinsia brevicaulis* Sprengel, Syst. Veg. 2: 863. 1825.

TYPE: Summae alpes Carnith. (holotype, ?).

Hornungia alpina subsp. **font-queri** (Sauvage) O.

Appel, comb. nov. Basionym: *Hutchinsia font-queri* Sauvage, Collect. Bot. (Barcelona) 7: 1096. 1968. TYPE: Morocco. Le versant nord

du jbel Tissouka, 2050 m, 10 July 1961, C. Sauvage 16975 (holotype, MPU).

Hornungia alpina subsp. **polatschekii** (Láinz) O.

Appel, comb. nov. Basionym: *Hutchinsia alpina* subsp. *polatschekii* Láinz, Anales Jard. Bot. Madrid 41: 204. 1984. TYPE: Spain. Lagrán (Alva), Cruz del Castillo, rocas cara N,

1400 m, 19 July 1983, J. Alejandro & G. Morante 5104/83 (holotype, AEPNA).

Acknowledgment. This article is based on a doctoral study by Oliver Appel in the Faculty of Biology, University of Hamburg, which is supported by the Deutsche Forschungsgemeinschaft.

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